SFA Modernization Partner

United States Department of Education
Student Financial Assistance

Data Warehousing Implementation Strategy
High-level User Information Requirements Matrix, Version 1

Task Order 21
Deliverable 21.1.1

June 30, 2000

Contents

Introduction

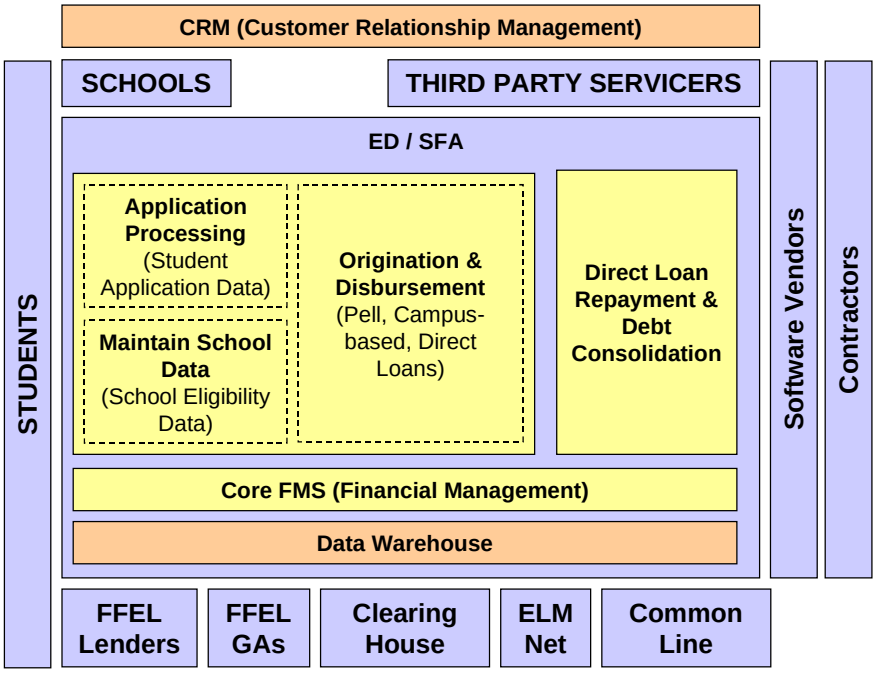
Data warehousing is a stategic initiative for SFA according to the SFA Modernization Blueprint. A data warehouse can benefit SFA by centralizing data and making access, reporting, and analysis quick and easy. Fundamentally, a data warehouse provides:

- centralized reporting of operational data – today SFA spends millions on report generation from a variety of internal systems, and has difficulty reconciling the reported information

- timely decision support information to the decision makers – today the National Student Loan Data System (NSLDS) serves as the de facto decision support system since it is the only internal system that centralizes data. A true data warehouse is organized for speedy information delivery to the decision makers.

As depicted in the modernization vision for 2004 below, data warehousing will play a key role in information delivery.

Virtual SFA in 2004



The data warehousing team began the process of SFA-wide decision support and reporting requirements gathering as part of Task Order 21. This was an important first step in planning for the enterprise data warehouse. However, it should be noted that this deliverable is version 1 of the requirements, suggesting that there should be several iterations of the requirements gathering process to gather more requirements and refine those described here.

Scope

Although the data warehouse team hoped to gather requirements from all of the business units, some business units simply did not participate in the process. Others who participated were not able to give us sufficient strategic decision support information. Below is a summary of the type of information we obtained form each business unit:

- For the Financial Partners Channel, we obtained a relatively complete view of the requirements, since we interviewed all directors and subject matter experts in that organization

- For the Chief Financial Officer organization, we obtained only their quick-hit (interim) project requirements. The CFO organization expects the new SFA Financial Management System (FMS) to provide many of the reporting capabilities in the near future. Consequently, they wanted to wait for FMS's capabilities before engaging in the data warehouse requirements gathering process.

- The Students Channel requested our team to limit our data warehouse requirements to the CDS Retirement effort.

It is important to gather requirements from the Schools Channel and the Data Analysis group. It is also important to obtain broader requirements from the Students Channel and the CFO before implementing an enterprise data warehouse. However, data marts can be built for business units who have quick needs for reporting and analysis.

Financial Partners Channel Requirements

The Financial Partners Channel is in the process of transforming their business processes and systems to deliver superior service. At the request of the FPC the team reviewed select business processes to identify data warehouse opportunities. These processes are described below.

Business Processes

1. *Lender & Guaranty Agency Payments* - The Lender & Guaranty Agency Payments business process manages the accounts receivables and accounts payables for the lenders and guarantors participating in the Title IV loan program. The process begins when lenders and guarantors submit their monthly / quarterly financial reports. These reports form the basis for most payments and receivables between the Department of Education and the partnering institutions. An SFA contractor receives the reports and performs data entry and validation using the FFEL system, issues acceptance / rejection notifications, and sends payment requests to the Department of Education Office of the Chief Financial Officer (OCFO). The OCFO approves the payment request and forwards it to the Treasury. The Treasury processes the payment information and disburses payments to the lenders and guaranty agencies. In addition to these transaction payment responsibilities, the Lender & Payment Guaranty Agency Payment process also responds to ad hoc information requests from lenders, servicers, GA's, FPC Oversight and Technical Assistance staff, and borrowers.

2. *Oversight & Technical Assistance* - The Oversight process includes the planning and execution of performance reviews of lenders, guaranty agencies, secondary markets, and servicers. Technical Assistance is provided on an as-needed basis to these same entities as it relates to the review process. The main components of a program review include targeting and scheduling entities, conducting pre-planning activities, performing the actual review, and following-up and closing the process. The key stakeholders include FP Oversight and Technical Assistance regional staff, lenders, guaranty agencies, secondary markets, and servicers.

3. *Contract Management* - Contract Management involves development and analysis of task orders, development and review of statements of work, and contract acceptance / rejection decision-making. These processes occur at both the enterprise and channel levels. The Contract Management group supports new contract set-ups, contract recompetes, sole source extensions, and GSA schedule buys. Key stakeholders include Financial Partners Channel Contract Administration, ED Contracts, the contracts panel, internal users, offerors, and selected vendors.

4. *Program Development* - The main functions of Program Development are to research and respond to formal and informal inquiries and to disseminate policy information. These processes are conducted at both the enterprise and channel levels. Inquiries are received from guaranty agencies, lenders, regional SFA staff, and the public (congressional offices, etc). Policy information is forwarded to regional SFA staff as well as other SFA customers. The key stakeholders include Program Development (Financial Partners Channel and SFA) SFA regional staff, and all requestors.

Requirements

The data warehouse team conducted focus group meetings and one-on-one interviews with FPC staff during the period between Thursday May 11, 2000 and Thursday June 8, 2000. The team interviewed representatives responsible for each of FPC's primary business processes including:

- Nettie Harding – Oversight & Technical Assistance (Headquarters)
- Greg Senseney – Oversight & Technical Assistance (Headquarters)
- John Reed – Oversight & Technical Assistance (Regions)
- Tony Magro – Lender & Guaranty Agency Payments
- Jack Reynolds – Program Development

The team also reviewed the FPC Current Environment Assessment Deliverable (# 10.1.1) produced by the Financial Partner Transformation (Task Order # 10.1) team.

The requirement gathering process identified opportunities to use the data warehouse architecture to add value to FPC business processes. They include Lender & Guarantor Risk Modeling, Guarantor Solvency Analysis, and Ad hoc Reporting & Analysis. Each data warehouse opportunity is described in detail below.

Lender & Guarantor Risk Modeling
Each year, FPC reviews a sample of the partnering institution population to verify their compliance with the Title IV loan program requirements. These reviews take the form of desk reviews or site visits. The existing review candidate selection process is manually intensive and inconsistent. FPC seeks to convert this process to one based on an analytic risk model that rates all partnering institutions against a set of standard performance criteria. The risk model output

will rank the partnering institutions according to their adherence to the performance criteria. Then FPC could concentrate its limited oversight resources on the identified.

During our interviews, FPC's subject matter experts identified four potential risk model factors. These included:

- Default Rate Factor
- ED Form / NSLDS Discrepancy Factor
- Prior Review / Audit Factor
- ED Form Reasonability Edit Factor

These are not intended to constitute an exhaustive list of risk factors, and there is no guaranty that the final risk model will incorporate these factors. A separate FPC team is charged with developing the complete lender and guarantor risk models. However, the factors described in this document provide a starting point for envisioning the architecture necessary to support lender and guarantor risk modeling.

The data warehouse is an ideal platform for implementing the lender and guarantor risk models. Risk modeling requires the consolidation of loan related data from a variety of sources into a central repository. Then the consolidated data must be standardized (cleansed) and stored in a format that supports the desired analytic processing. Finally, geographically disbursed end-users must have access to tools that enable them to perform the analysis. The data warehouse architecture is uniquely qualified to meet these requirements.

The following sections describe each of the risk factors identified during the data warehouse requirement gathering process.

Default Rate Factor

Channel: Financial Partners Owner: Nettie Harding	
Description This risk factor considers the default rate associated with each partnering institution's loan portfolio. Loan portfolio default rates are currently derived from the loan level detail data that guarantors transmit to NSLDS. This data is periodically downloaded to PEPS. This factor is assigned a less favorable rating as a partnering institution's portfolio default rate increases. Institutions with lower default rates will receive more favorable ratings.	**Data Source** • NSLDS or PEPS **Sample Dimensions** • Financial Partner Type • Loan Type • Geography • Time **Sample Facts** • Default Rate

Prior Performance Review Factor

Channel: Financial Partners Owner: Nettie Harding	
Description This risk factor considers previous performance reviews and audits of partnering institutions. SFA, GA's, and independent CPAs review / audit the performance of SFA's Financial Partners. The review / audit results are summarized and stored in PEPS. This risk factor measures the time lapsed since the partnering institution's previous review / audit. This factor is assigned a more favorable rating for shorter time lapses, and a less favorable rating for longer ones. This risk factor measures the liability amount resulting from the partnering institution's previous performance reviews / audits. This factor is assigned a less favorable ratings for higher previous liabilities, and a more favorable rating for lower ones.	**Data Source** • PEPS **Sample Dimensions** • Review / Audit Type (SFA, GA, CPA) • Reason Code • Geography • Time **Sample Facts** • Resultant Liability • Previous Review Date

ED Form/NSLDS Variance Factor

Channel: Financial Partners
Owner: Nettie Harding

Description

This risk factor considers variances between the two data sources describing lender and guarantor loan portfolios.

1. Guarantor to NSLDS Downloads
   Guarantors receive data describing each loan in their portfolio from the associated lender. They consolidate this data and transmit the loan level details to NSLDS. The guarantor sends an update to NSLDS whenever loans are added to its portfolio or an existing loan is updated.

2. Lender/Guarantor Reports
   Guarantors summarize and report on the status of their loan portfolios via ED Form 1130: Guaranty Agency Quarterly Report and ED Form 1189: Guaranty Agency Monthly Claims and Collections Report. Similarly, lenders report on their loan portfolio via ED Form 799: Lender's Interest and Special Allowance Request and Report. These forms are effectively the partnering institution's invoice to ED. These forms report at the overall portfolio levels as opposed to the individual loan level.

This risk factor measures the variance between the outstanding loan amount, loan origination amount, and other amounts as reported to NSLDS and the ED Forms. This factor is assigned a less favorable rating for higher variances and a more favorable rating for lower ones.

NOTE: SFA will convert the processing of ED Forms 1130 and 1189 from FFEL to the new SFA FMS system. This conversion is scheduled to take place 10/2000. FFEL will remain operational to provide access to historical data, but all subsequent processing for guarantors will occur in SFA FMS.

Data Sources

- NSLDS
- FFEL
- SFA FMS

Sample Dimensions

- Time (Quarter, Month)
- Geography (Region, Location)
- Loan Type

Sample Facts

- Loan Origination Amount
- Outstanding Loan Amount

Reasonability Edit Factor

Channel: Financial Partners **Owner:** Nettie Harding	
Description This risk factor considers the reasonability of the monthly and quarterly reports lenders and guarantors submit to SFA. Lenders are required to submit the ED Form 799: Lender's Interest And Special Allowance Report on a quarterly basis. This form summarizes the lender's loan portfolio. Similarly, guarantors are required to summarize their loan portfolio activity in the ED Form 1130: Guaranty Agency Quarterly Report, and ED Form 1189: Guaranty Agency Monthly Claims & Collection Report. During data processing, SFA's operational systems perform a series of reasonability edits which evaluate the form values in search of potentially anomalous scenarios. This risk factor measures the number (and perhaps the type) of failed reasonability edits associated with a partnering institution within a specific timeframe. This factor is assigned a less favorable value as the number of failed edits increases, and a more favorable value as the number decreases. NOTE: SFA will convert the processing of ED Forms 1130 and 1189 from FFEL to the new SFA FMS system. This conversion is scheduled to take place 10/2000. FFEL will remain operational to provide access to historical data, but all subsequent processing for guarantors will occur in SFA FMS.	**Data Source** • FFEL • SFA FMS **Dimension** • Financial Partner Type • Geography • Time (Quarter) **Facts** • Reasonability Edit Type • Edit Failure Reason

Guarantor Solvency Analysis

Each year, FPC analyzes the financial status of each of the Title IV loan guarantors. FPC reviews their current and projected financial status in an effort to identify guarantors who are in danger of becoming insolvent within the next five years. This early warning mechanism gives FPC an opportunity to work with at risk guarantors to develop corrective action plans. In the event that the guarantor's Title IV loan business cannot be salvaged, advanced warning enables FPC to prevent service interruptions by shifting affected loans to more solvent guarantors.

FPC extracts ED Form 1130 (Guaranty Agency Quarterly Report) data from the FFEL system to feed this analysis. Trend analysis is a key component of this work. Therefore, the ED Form

1130 data extracted spans multiple years for each guarantor. FPC loads the extracted data into a spreadsheet workbook to perform the actual analysis. A separate workbook for each guarantor summarizes their past, present, and projected financial performance. The exact nature of the analysis varies from year to year as regulatory and other focuses shift. FPC may build in specific what-if scenarios to test the impact of proposed regulatory changes. However, certain analytical themes are repeated during each cycle. For example, the guarantor's reserve fund is broken down to its constituent components and fund balance changes are tracked over a multi-year time period.

The data warehouse can support guarantor solvency analysis by streamlining end-user access to the ED Form data necessary to support the analysis. It may also be possible to integrate some of the recurring analytical themes into the data warehouse architecture. Changes in fund balances could be tracked on an ongoing basis as opposed to annually.

Ad hoc Reporting & Analysis

FPC analysts at headquarters and the regions have an on-going need to analyze information contained in FFEL, NSLDS, and PEPS. However, access to this data is not widely available. Reasons for the lack of availability range from simply not having access to the desired system to users not having the training necessary to use the available end-user access tools (e.g. QMF). Therefore, most FPC personnel rely on the Oversight and Technical Assistance group for ad hoc analysis and reporting. These analysts are skilled at leveraging spreadsheets and desktop databases to analyze PEPS, NSLDS, FFEL, and other data.

The data warehouse can streamline end-user access to operational data. By consolidating data from disparate systems into a common repository, structuring the data in an intuitive schema, and providing web enabled access to FPC, the data warehouse can enable a broad variety of FPC analysts to perform on-the-fly, self serve analysis.

SFA Chief Financial Officer Requirements

The CFO performs SFA's budget planning, financial reporting, and activity based costing activities. While there are several more business processes at the CFO, the ones below relate to the quick-hit project requirements. The current state of each process is described below.

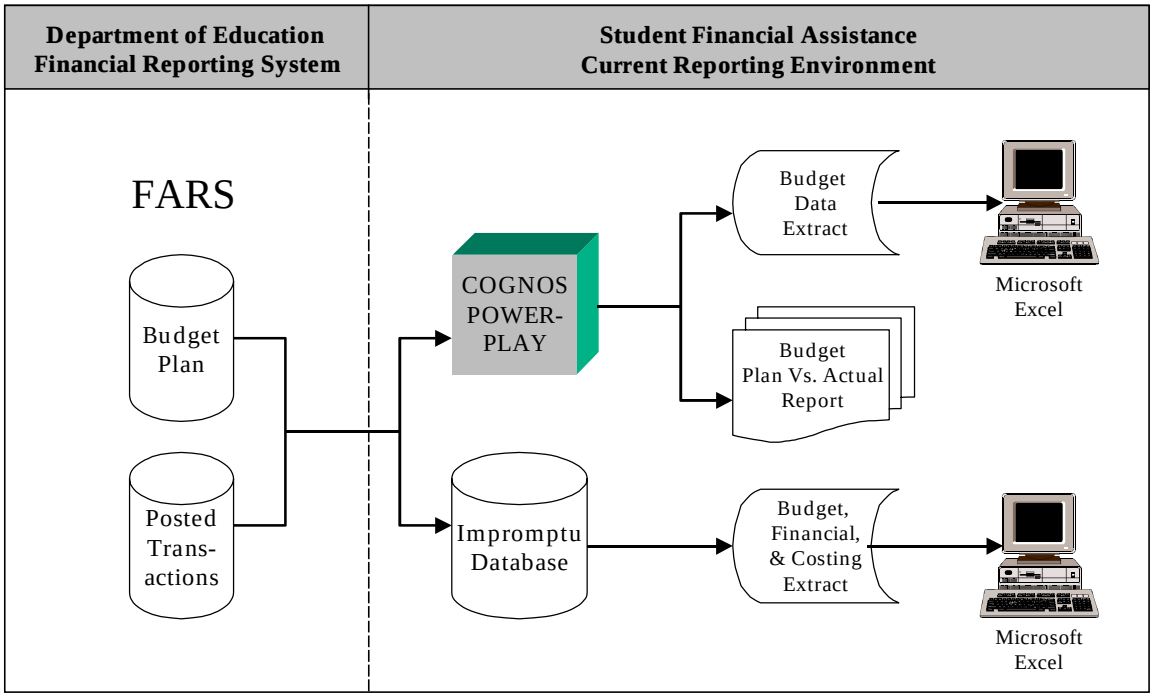
Business Processes

1. The current budget planning process is labor intensive and time consuming. The process begins near the beginning of each month when the Department of Education CFO releases its monthly Plan vs. Actual Reports. Once the report is created, SFA CFO staff manually reformat the data to meet SFA's requirements and load it into a multi-dimensional database. This reformatting process takes one full-time employee 40 hours each month. The budget planning group must also run the Operating Plan Report, the Fund Balance Report, and other ad hoc budget queries on an as-needed basis. These ad hoc reports and queries take two full-time employees a combined total of 15 hours each week.

2. The financial reporting group reconciles the Department of Education Financial Accounting and Reporting System (FARS) transactions with the guaranty agency and lender reports in the Federal Family Education Loan System (FFEL). The CFO extracts data from both systems to support this process. CFO users extracts the data by running a query tool against the production database. This reconciliation extract process takes one full-time employee 35 hours per month. The financial reporting group is also responsible for any ad hoc reports and queries generated from financial data. These include any reports that must be created for congressional analysis. These ad hoc reports and queries take five full-time employees a combined total of 35 hours each week.

3. The activity based costing group is responsible for extracting all posted data from FARS and downloading that data into the activity based costing system. This extract is so time consuming that the users start the extract before going home in the evening so it is completed the next morning. The activity based costing group also runs ad hoc queries to support specific financial data questions associated with an activity. These ad hoc queries take one full-time employee two hours each week.

The figure below illustrates the CFO's current reporting environment. The environment is based on budget plan and posted transaction records extracted from the Department of Education's financial accounting and reporting system. These transactions are loaded into a COGNOS/Powerplay multi-dimensional database and an Impromptu relational database. The CFO budget planning group uses the multi-dimensional database to generate the budget vs. actual report. This group also extracts data from the Powerplay cube for ad hoc processing in Microsoft Excel. The Impromptu database is used to support a variety of budget planning, financial planning, and activity based costing reporting and analysis. In many cases, the CFO extracts data from the Impromptu database for manual processing in spreadsheets. The CFO estimates that the maintenance of this environment requires as much as 137 hours a week. This resource intensive process provides a limited range of ad hoc reporting capabilities and minimal analytic capability.



SFA Current Reporting Environment

Requirements

The data warehouse team met with key staff within the SFA CFO budget planning, financial reporting, and activity based costing groups. Subject Matter Expert interviews included:

- Linda Paulsen - Deputy CFO
- Dick Austin – Budget Planning
- Greg Garnett - Budget Planning
- Russ Young - Activity Based Costing
- Andy Cho - Financial Reporting

The team reviewed existing reports and analysis as well as the architecture of the existing reporting environment.

The requirement gathering process identified opportunities to improve the CFO's budget planning, financial reporting, and activity based costing activities. The primary opportunity is the automation of the monthly accounting and financial reports that currently consume significant resources within the CFO office. These reports include the following.

- SFA Plan vs. Actual Report
- SFA Current Plans and Fund Status Report
- SFA Operating Plan Report
- SFA Fund Balance Report

In addition, the CFO needs the FARS data used to generate these reports to be consolidated in an environment that provides more powerful ad hoc report and analysis capabilities. The CFO needs to be able to efficiently execute the following types of queries:

- Ad hoc queries to support budget planning requests
- Ad hoc queries to support reconciliation (FARS to FFEL)
- Ad hoc queries to support financial reporting requests
- Ad hoc queries to support downloads from for Activity Based Costing
- Ad hoc queries to support activity based costing requests.

The following sections describe each of the CFO office's standard financial reports. These reports need to be automated in the data warehouse environment and the supporting data will be made accessible for ad hoc query and reporting.

1. SFA PLAN VS. ACTUAL REPORT

Description - This report compares the SFA budget plan to the actual financial transactions posted to the Department of Education's financial accounting and reporting system. The report summarizes SFA's budget plan, commitment, obligation, and expenditure amounts by organization code and object class. The CFO office uses this report to track SFA's budget expenditures against its plan during the fiscal year.

Users - Dick Austin and Greg Garnett, Budget Plan Division

Row Headers - Organization Code, Object Class

Column Headers

(A) Budget Plan Amount
(B) Commitment Amount
(C) Obligation Amount
(D) Expenditure Amount
(E) Sum of Commitment, Obligations, and Expenditure Amounts
(F) Plan to Date Balance Amount (F = A – E)

User Specified Selection Criteria - Time Period, Organization Code, Object Class

Frequency - Monthly

2. SFA Current Plans and Fund Status Report

Description - This report restates the information in the Plan vs. Actual report by channel, broken down into payroll and non-payroll totals.

Users - Dick Austin and Greg Garnett, Budget Plan Division

Row Headers - Object Class, Expense Type (Payroll or Non-payroll)

Column Headers

Planned Amount Thru MM/DD/YY
Actual Amount Thru MM/DD/YY
Balance Available
% Spent Thru MM/DD/YY

User Specified Selection Criteria - Report Month, Organization Code, Object Class

Frequency **-** Monthly

3. SFA OPERATING PLAN

Description - This report lists planned dollars for each month in the fiscal year by organization code and object class.

Users **-** Dick Austin and Greg Garnett, Budget Plan Division

Row Headers **-** Organization Code, Object Class

Column Headers
Budget Plan Amount (One column for each month in the fiscal year)
Yearly Total Amount (Sum of Budget Plan Amounts)
Budget Cycle

User Specified Selection Criteria **-** Fiscal Year, Organization Code, Object Class

Frequency **-** On Demand

4. SFA FUND BALANCES

Description **-** This report lists the budget, commitment, obligation, expenditure and available balance amounts for each limitation and fund by fiscal year.

Users **-** Dick Austin and Greg Garnett, Budget Plan Division

Row Header
Limitation
Fiscal Year
Fund
Organization Code
Project Code

Column Header
Budget Plan Amount
Commitment Amount
Obligation Amount
Expenditure Amount

Available Balance Amount

User Specified Selection Criteria
Fiscal Year
Limitation
Fund
Organization Code
Project Code

Frequency - On Demand

Students Channel Requirements

Our team met with representatives from the Students Channel to discuss their data reporting and analysis needs. While the Channel representatives recognized the value of data warehousing, they wanted our team to focus on requirements related to delinquency reporting associated with the Central Data System (CDS).

A component of CDS creates and transmits student loan delinquency reports to Title IV schools. This delinquency reporting function needs to be re-platformed as the Students Channel retires CDS in November 2000. In the short term, the data warehouse will take over and replicate the deliquency reporting from CDS. In the long term, it will enable schools and SFA to derive more analysis capability from the delinquency data.

Business Process

CDS is a data routing system originally designed to support multiple loan servicers. CDS routes 1.8 million new loans from the Loan Origination and Loan Consolidation systems to the Loan Servicing System each year. Since its inception in 1996, a series of regulatory modification and enhancements have pushed CDS beyond its original scope. This and the duplication of effort on other systems were documented in the Modernization Blueprint and the decision was made to retire the CDS system and roll its 12 functions into existing systems or new strategically aligned systems.

One of CDS' twelve functions is delinquency reporting. Every month, CDS creates the following reports / data files:

- Monthly report of all delinquent students for the Department of Education
- Monthly report of all delinquent students by school for individual schools
- Monthly data file of all delinquent students by school for individual schools

The existing mainframe processes produce these reports / files by capturing data from Loan Servicing, the Title IV WAN, and other sources. Then the processes execute a series of COBOL programs to create the delinquency reports. The reports and files are ultimately transferred to the Title IV WAN for distribution to the participating schools.

Supporting Data Sources

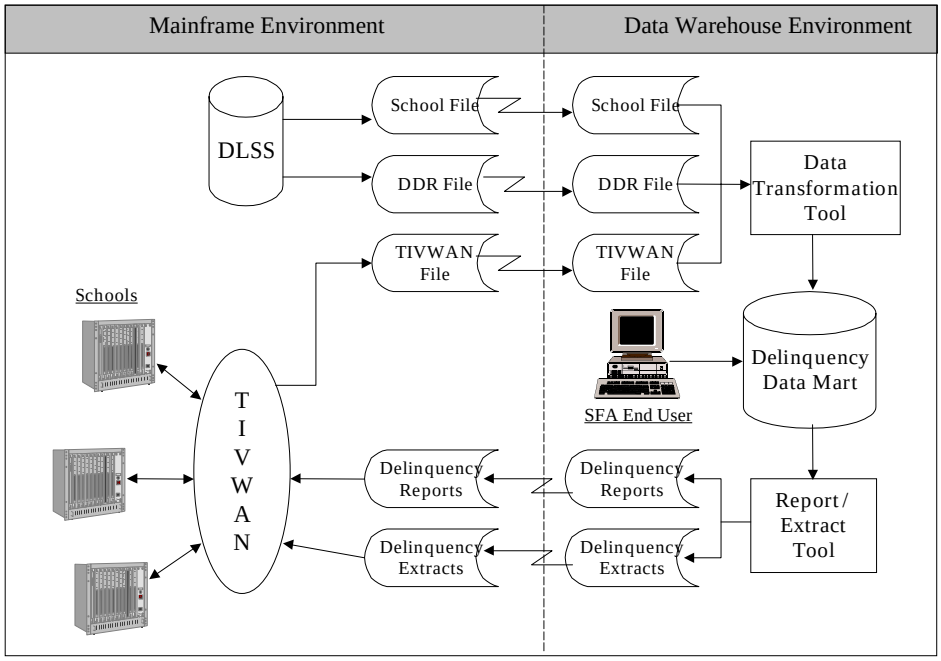
The three files described below are the inputs to the delinquency reporting process. The Title IV Wide Area Network (TIVWAN) and the Direct Loan Servicing system (DLSS) generate these files. TIVWAN links the Department of Education with all of the institutions participating in the Title IV loan program. It consists of dedicated leased lines and software tools that facilitate messaging and file transfer. Created in 1993, the Direct Loan Servicing System (DLSS) tracks loans from booking to final payment, and processes Direct Loans that go into default.

Data Source	Content Extracted
TIVWAN Address File	The TIVWAN Address File tells the delinquency reporting process which format each school wants to receive the delinquency report in: formatted report, data file, or both. The delinquency process also uses this file to determine each school's TIVWAN Address for file transfer. This file contains the following fields: • Institution ID • Institution Name • TIVWAN Address • Delinquency report format
DLSS School File	The Direct Loan School File drives the creation of the Department of Education's delinquency report. A breakdown of delinquencies per school will be generated for every school listed in this file. This file contains the following fields: • School ID • School Name • School Short Name
DLSS DDR File	The Loan Servicing system sends the Delinquency Data Record File (DDR) to CDS on a monthly basis. This file contains loan level detail data on all delinquent loans for all schools. This file contains 34 fields and is the core of the Department and schools delinquency reports.

Requirements

The delinquent loan reporting process needs to be transferred from the CDS platform to the data warehouse. The current requirement is to simply replicate the deliquency reporting functionality of CDS in the data warehousing architecture.

As illustrated in figure below, the TIVWAN Address File, DLSS School File, and the DLSS DDR File will continue to be generated by the current mainframe processes. These files will be transmitted to the data warehouse environment, transformed, and loaded into appropriate database objects. An end user access tool will format the delinquency reports and files in accordance with the current report and file definitions. The completed delinquency reports and files will then be transferred to the mainframe platform and distributed to the schools via TIVWAN.



Proposed Delinquency Reporting Approach

All of the current delinquency reporting functions will be mirrored in the data warehouse environment. The Schools Channel will derive several benefits from re-platforming this process. The modern architecture of the data warehouse environment will be more cost-

effective to maintain and enhance than the existing architecture. Additional baseline reports, user-created reports and true On-Line Analytical Processing (OLAP) are all possible with a data mart platform. In future phases, the delinquency reporting process can be expanded to support self service web-enabled extractions and analysis of student loan data.